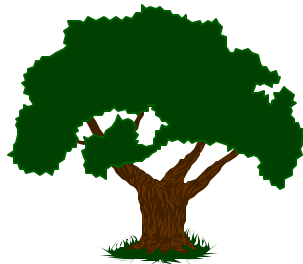


Report To  
**Office of Energy Management and Conservation**  
State of Colorado  
Division of Purchasing  
225 East 16th Ave, Suite 802  
Denver, CO 80203-1613

## **Commercial Office Building Recycling Program**

Submitted by:



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## **Disclaimer**

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## **Acknowledgements**

This report was prepared by Waste-Not Recycling under contract with the Colorado Governor's Office of Energy Management and Conservation, Commercial Office Building Recycling Program. The program was completed with cooperation from Agilent Technologies, Hewlett-Packard, State Farm Insurance, Medical Arts Building, City of Fort Collins, North Front Range Solid Waste Action Group and other participating businesses.

## **Executive Summary**

Waste-Not Recycling tested various commercial building recycling techniques in the northern Front Range area of Colorado. The commercial building recycling programs had varying degrees of success. Over all the parties involved felt their programs benefited from the information. The recycling program managers and those directly involved appreciated the extra energy spent on education and disseminating information.

### **Waste-Not:**

- Created an Educational Tool Kit. Included in the kit are an educational system with agendas, samples, posters and ways of presenting to a variety of people and time schedules.
- Offered three types of collection services to commercial office building: Collection from the back dock or outside area, aisle collection and cubicle collection.
- Increased the amount recycled in targeted commercial office buildings up to 300 %.
- Measured the impact of education and full service recycling on building employees and found that improving education and promotion of the program does indeed increase participation.
- Began an Environmental Stewardship Action Program (ESAP) for businesses in Colorado. We created a logo, brochure and the steps necessary to be part of the program.
- Developed recycling education kits, promoted buying recycled, Earth Day and America Recycles Day.
- Worked with purchasing departments to discover options to reduce, reuse and buy recycled.
- Drafted a Commercial Building Construction Recycling plan and brochure and worked with contractors to "Design It For Recycling" program.

## Description of Projects

### Commercial Building Recycling Tests and Measurements

Waste-Not Recycling identified five large Commercial Office Buildings in the northern Front Range region for the purpose of gathering data to assist in the duplication of successful Commercial Recycling Programs.

The purpose of this proposed program was to determine the best ways to design and implement a commercial recycling program, educate the client to make the program successful, and increase the amounts of commodities collected and decrease the amounts going to the landfills.

The buildings chosen were:

Agilent Technologies. To test the impact of increased education, signage and converting from recycling sorted white ledger and colored ledger to a combined office pack approach.

Hewlett-Packard Taft Building. To see what kind of volume increases could be obtained from switching from cubicle collection to aisle collection.

ABC business. To discover if there would be an increase when switching from custodians collecting the paper and delivering it to a container outside the building, to a recycling technician collecting the paper from the individual cubicles.

State Farm Insurance. To test the implementation of a “Green Team” which assisted in additional education and promotion of the recycling program.

Medical Arts Building. To use as a baseline to determine whether increases were consistent with a building that received no additional attention but already had internal collection provided.

#### **Waste-Not:**

- Established baseline data through occupant surveys, dumpster dives/trash analysis and collection data of existing programs.

- Designed custom programs based upon information gathered and needs of the buildings.

- a. Commodities recycled included:

Office paper, newspaper, tin, glass and plastic, metal, cardboard, magazines, wood, concrete, bricks and other construction waste. Office paper was the commodity tracked for purpose of this study from the commercial buildings. Construction waste materials were tracked from the construction sites.

- b. Determined and provided the containers and collection methods of all commodities. Individual desk side boxes were provided for individual workstations, larger containers were placed at satellite/aisle collection points for collecting paper.

- c. Three collection systems were explored: 1) Commodities collected by Waste-Not staff throughout the buildings, 2) generators responsible for depositing commodities in aisle/recycling center locations where Waste-Not staff collects and 3) generators responsible for getting commodities outside to one collection site for pick up by Waste-Not.

●Provided on site education and training.

- a. A duplicable training program in notebook form that includes guidelines and samples with various agendas for different needs and timelines, recycling educational information, information for “green teams,” business environmental audit, sample surveys, waste prevention ideas and other facts was created.
- b. “Green teams,” made up of people interested in recycling, were organized at each site to improve communication, identify problems and solutions and get more employees recycling. The level of interest varied from the participants and we discovered that it was necessary to continue to bring ideas to the table to keep the momentum going.
- c. Posters were designed and printed to encourage people to recycle and participate in the ESAP. We provided presentations and displays and “You Saved” reports.
- d. We set up displays and staffed booths at America Recycles Day, Earth Day, Buy Recycled events and at special building events or gatherings.

●Provided regular collection services. Weights of all commodities were tracked. Monthly totals were provided to generators. Graphs of progress and “You Saved” reports were sent to each site to encourage and inform employees.

●Identified to customers’ commodities that can’t be recycled and suggested recyclable or reusable alternatives such as reusable mugs. We made efforts to find ways to recycle ESD bags because that was an item identified as being thrown out and that had some toxic effect due to the nickel content. We were not able to find markets for the bags. We did discover that the bags could be tested and re-certified for their anti-static properties. However, that process is expensive and not used locally. We assisted our customers in finding outlets for their packaging waste (“peanuts,” soft foam, bubble wrap, etc.).

### **Education and Support Materials to Increase Recycling**

Waste-Not created an educational kit to be used in educating employees at Commercial Buildings. This kit includes samples and detailed instructions designed to meet the needs of various types of departments and schedules. We designed and printed posters to be displayed in businesses to educate and remind employees to recycle.

#### **Waste-Not:**

1. Compiled samples of various types of paper that can and cannot be recycled and included those in the education kit. Also worked with green team members to make posters with this information and have forms specific to their business.
2. Researched types of posters that attract attention and are most likely to be displayed. Determined that one that is full color, very attractive and simple would be the best.
3. Made agendas for various types and times available based upon priority of information.
4. Waste-Not developed short pre and post surveys. Surveys are difficult to get people to participate in. We made a game out of a survey and had very good results.
5. Networked with CAFR to provide information at the Denver Earth Day event. Worked with the OEMC to provide information at the capitol Earth Day event. We worked

with NFRSWAG many times to provide recycling education. We assisted in the pumpkin and leaf recycling program, buy recycled conference, Earth Day fair and Waste Saver of the Year recognition program. We partnered with the City of Fort Collins to collect pumpkins and had activities for kids at the drop off location.

### **Environmental Stewardship Action Program (ESAP)**

Waste-Not created a program that provides businesses and institutions with the tools to promote their commitment to being environmental stewards, and gives consumers the ability to support those efforts. This project is called the Environmental Stewardship Action Program. We designed a logo and printed decals for businesses to post. We also designed a poster that businesses can display to further identify the program. They will also be able to use the logo on their publications. NFRSWAG, Agilent, State Farm Insurance and the City of Fort Collins worked in partnership with Waste-Not Recycling to approve the logo and design of the program. The participants in this program are leaders setting the pace for other Commercial Businesses who wish to display an Environmental Stewardship emblem at their place of business or on their publications. This program gives commercial businesses the incentive to provide some tracking of their diversion rates. This information will be used to encourage business development and to help communities develop plans to sustainably deal with our growing waste stream. This program has taken much longer to get designed and established than expected. It was determined that this is a long-term project.

#### **Waste-Not:**

1. Worked with businesses to gather information on best way to implement program.
2. Designed and printed emblem for stickers and logo.
3. Beginning to promote program. We placed an ad in the map to the Poudre Trail promoting recycling and the ESAP and will run other ads to promote the program.
4. Designed and printed brochure.
5. We are networking with NFRSWAG and City of Fort Collins to engage regional use and support of the program. This will be ongoing and will take a great deal of time to get the public aware of the program.
6. We created a poster to make people aware of the program.

### **Buy Recycled, America Recycles Day and Earth Day Promotion**

Buy Recycled Displays were created to be displayed at area businesses and governmental buildings and events. The displays included items made from recycled materials. Colorado Association For Recycling awarded Waste-Not Recycling with a certificate for “Best Use of Recycled Products” in Colorado for this display.

An EcoQuest program was created for businesses to test their recycling and environmental knowledge for Earth Day. The EcoQuest was a fun way to survey participants while they competed for prizes. We also worked with purchasers to determine that the use of Styrofoam cups was not as cost effective as perceived. For Earth Day we partnered with Agilent to buy reusable mugs. We gave the mugs to folks who pledged to use the mugs instead of Styrofoam cups. We gave away over 300 mugs.

**Waste-Not:**

1. Gathered items for displays from Future Solutions, Real Goods and elsewhere.
2. Worked with NFRSWAG for regional support.
3. Networked with CAFR (Colorado Association For Recycling) America Recycles Day Coordinator and representatives in Greeley, Loveland, Windsor and Fort Collins on event promotion.
4. Displayed new Buy Recycled Kits during Earth Week and America Recycles Day.
5. It was difficult to track the number of people since some of the events had hundreds of participants who would have walked by the displays. We averaged talking to about 40 people at each of the business displays. At the Fort Collins Earth Day event we had two people who were busy talking to people for most of the day. We gave away over a hundred mugs securing verbal pledges from each one to reuse the container instead of picking up a new Styrofoam cup for each visit to the water or coffee station. Over the course of events we talked to well over 1,000 people.

**Commercial Building Construction Recycling & “Design It For Recycling”**

The City of Fort Collins, Neenan Company and Waste-Not implemented a plan for builders of commercial buildings to recycle their waste. We provided various containers to Neenan who recycled wood, metal, rocks, brick, paper, cardboard, commingled (plastic, glass, aluminum), and some drywall. This project is highlighted on the City of Fort Collins web page and will encourage other contractors to recycle. We also partnered with the City of Fort Collins on a construction wood waste recycling pilot program. Containers were provided for participating contractors for all their scrap wood. The amounts, types of wood discarded and what stage of construction the builders were in was tracked.

**Waste-Not:**

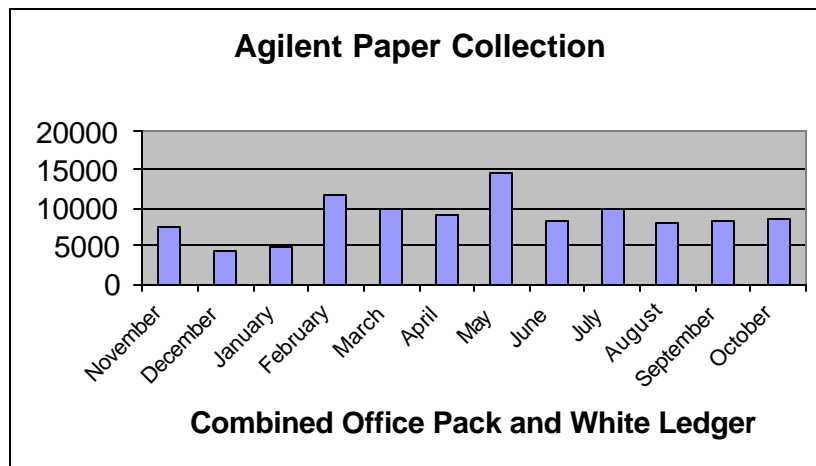
1. Identified contractors and architects willing to participate by talking to them and through the pilot program from the City of Fort Collins
2. Researched markets for construction waste by calling around the country, looking in the phone book, researching on line and touring facilities.
3. Researched collection methods for recyclable wastes by talking with contractors and providing various containers for their use to determine the containers that were the easiest for them to use. We created magnetic signs for the containers so they could be easily switched out. Different containers are necessary at the various stages of construction. We discovered that roll-off containers were most effective for wood, brick, concrete and rock. Depending on the stage, roll-offs were also provided for cardboard.
4. Provided information to builders regarding waste reduction and recycling needs through a construction waste flyer that we developed and printed.

## Program Results

### Agilent Technologies

In April we documented the locations of all the office paper collections. At this time we determined that some areas only had white ledger recycling containers. We decided that in order to make recycling easier and more efficient for our customers we would convert all containers to office pack. We relabeled the containers with easy to read signs. We created a clipart person with a “recycle head” that we used consistently to identify the containers and display what could be placed in the recycling container.

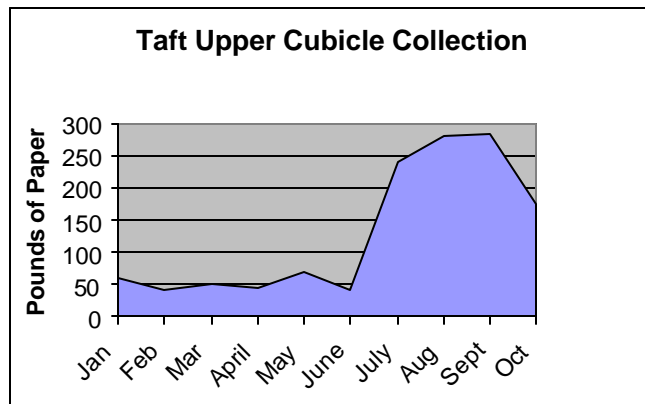
The biggest increase in paper was from April to May. It can be assumed that is due to the increased education and signage. The overall amount of paper recycled has leveled off at an increase of 70% from the first quarter baseline data to the last quarter.





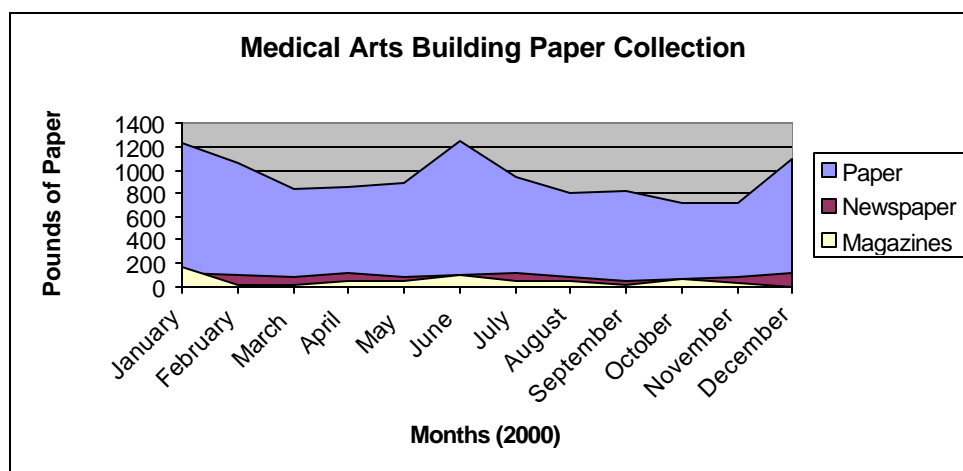
### Hewlett-Packard Taft Building

This building had aisle/satellite collection for office paper, magazines and newspaper. The containers were not uniformly marked and were not convenient for all people. We placed individual desk side containers at all the workstations. Once the boxes were in place and we started collecting the paper on a regular basis increased the amount of paper recycled an average of 300 percent. This shows the increases that can be achieved by making recycling easy.



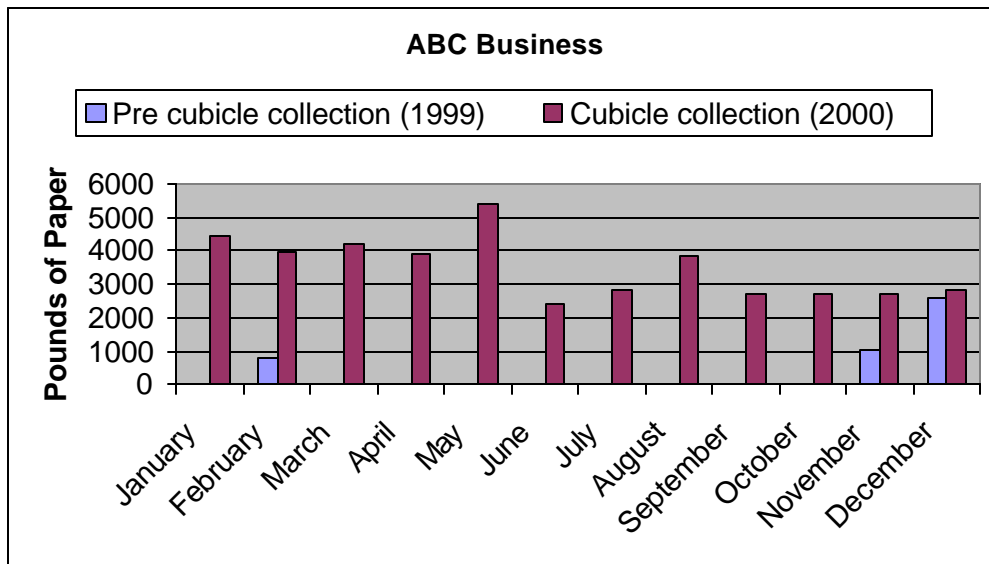
### Medical Arts Building

We used this building as a test site to determine if there should be expected increases over time without additional services or education. The end of year clean out is shown and a mid year peak but other than those the paper collected remained fairly steady.



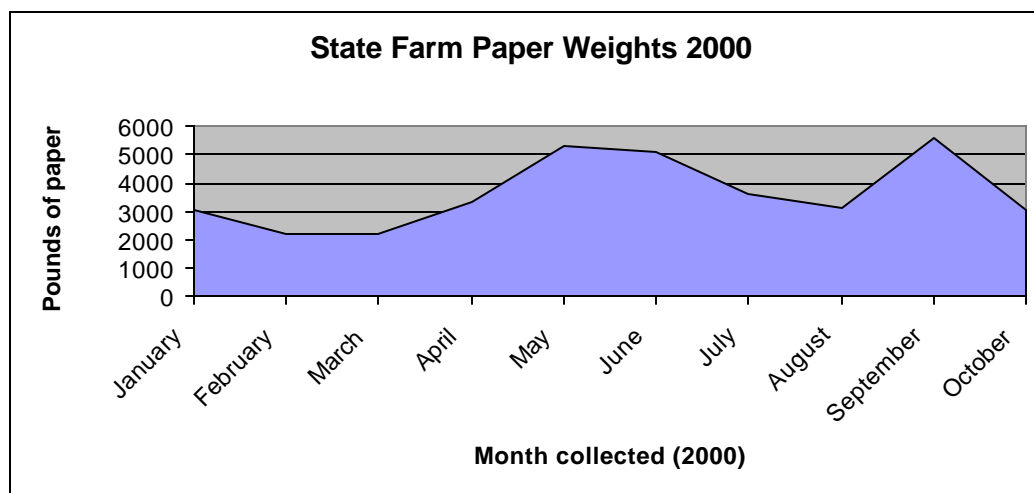
## ABC Business

The custodial crew was collecting the paper at this location and bringing it to a container that was placed outside for pick up. We came on site and had a recycling technician begin collecting the paper from the individual cubicles. The assumption is the paper was in part being put in recycling receptacles but thrown away by the collector. We have discovered this is a fairly common occurrence. By bringing in a person whose sole job is to recycle, the paper volumes increase. This shows a big benefit to bringing in a recycler to do the internal cubicle collection. From November 1999 through December 2000 22.8 ton of office paper was recycled resulting in 73.98 cubic yards being diverted at a cost savings of over \$665. The greatest benefit was gained from the 388 trees saved and the 1368 pounds of pollution that was not created. ABC has a very high diversion rate throughout the site. However, from our dumpster dives we were able to target a couple items and implement a process to get them recycled. We added chip sticks, damaged broom handles and plastic cleaning containers to the program. Styrofoam cups were repeatedly found and they were also a concern brought up by ABC employees when we were surveying them.



## State Farm Insurance

We worked with the Green Team and expanded our educational outreach to increase the amount of paper recycled. Posters were created and placed throughout the site, and information was posted on the televisions in the break rooms. State Farm changed custodial firms and the new firm did not know that they were not required to pick up the recycling boxes from the individual cubicles. State Farm and Waste-Not were not initially aware of this happening. This makes it difficult to pin down exactly how much of the increase is due to the education or the increased service. We did have a lot of information around Earth Day, which would explain the increases in May and June. The total amount of paper recycled by State Farm from December 99 through November 00 was 21 ton. This resulted in saving over 357 trees, prevented over 1,260 pounds of air pollution and over 69 cubic yards of material was diverted from the landfill. At an average of \$9 per cubic yard for trash services that saved \$623.



## Summary of Successes and Obstacles

- Because Waste-Not Recycling has been in the recycling business for twelve years we have systems in place to collect good baseline data from each site.
- Graphs of the progress are included in this report.
- We found people were more willing to participate in a survey when we made a game of it and had a drawing for prizes. We created a custom “EcoQuest” survey for various businesses and gave away t-shirts. Ninety nine percent of the people we surveyed said it was easy for them to recycle their paper. This showed that our collection containers were conveniently placed. Of the buildings that had recycling education most of them knew what types of paper could be recycled in the “office pack” program. In the buildings with little education, only half the people surveyed knew what could be recycled. One hundred percent of the responses said they would be willing to give up the fluorescent and dark colored paper in favor of less toxic and recyclable paper.
- There were increased amounts of paper recycled with each of the collection methods we

tested. The largest increase was seen when we went cubicle to cubicle to collect the paper. However there were substantial increases by improving the education and signage as well. There was no increase in the building that did not receive additional attention.

- The programs are all sustainable and are going to continue with the exception of the Taft building, where the employees were moved and the building is currently empty. We will start it back up once it is reopened.

- The biggest obstacles were the fact that there were many changes in the buildings during the time of the pilot programs. Hewlett-Packard split into two companies, the other being Agilent Technologies. We also ended up with new program managers. We had employee turnover but were able to maintain consistent service and contact with the program managers.

- There were many successes with the program. Each one of our target buildings had substantial increases and improvements. The greatest success was an increase in the amounts recycled. We are very happy with the outcome of the construction waste recycling program. The information gathered shows the cost effectiveness of diverting wood waste and will encourage its development. We also discovered the types of containers that are best suited for the various types of materials that are generated. Since we started this program there has been a tremendous increase in the number of calls we have received from contractors wishing to set up programs and design buildings with recycling in mind.

## **Project Evaluation**

From the discussions with the City of Fort Collins, NFRSWAG, and the commercial building occupants the programs were successful. It was necessary that we remain flexible and able to grow with the expanding needs of the program participants.

- From the pre-surveys (EcoQuest) we discovered that a large percentage of our clients are fairly well educated overall about what is recyclable and that they have a sincere desire to be part of the environmental solution. We do know that it is critical to begin programs with an educational component and continue that education with ongoing information, activities and events. Having events twice a year seems to be sufficient if you provide ongoing education.

- Graphs of the commodities recycled show a bigger than expected increase in the amount of paper recycled. The largest increase (over 300 %) was shown in the Taft building. We did not count the paper collected in the organized “move out” which was substantial. We do not know if any of the increase was due to the fact that the employees knew they would be moving. We do feel that the increase is reasonable because the initial program was somewhat haphazard and once we came in and evaluated the needs and made recycling easy people had no excuse to not recycle.

- The ESAP was created and is now available to area businesses. Responses from people we have talked to about this program have been positive. We discovered this program is a longer-term project that will require more time and marketing to fully realize the benefits.

- Comments from people utilizing and seeing the display kit were very positive. They were thankful for the information.

- Increase in waste being diverted from landfills by Commercial Buildings was achieved at all the locations. The amount of dollars saved can be determined by the cubic yards recycled versus landfilled.

- The program participants are continuing the programs. Due to the documentation other businesses are considering changing their collection methods.

## **Construction Waste Recycling**

### **Wood Waste Recycling Project with the City of Ft. Collins/The Neenan Company**

Waste-Not Recycling provided the recycling services for the new City of Fort Collins complex building. We partnered with The Neenan Company to determine the size, type and frequency of pick up that was necessary to recycle as much of their waste as possible. During the first five months of construction 45,435 pounds of material were recycled. This office building is a multi-story metal frame construction. The commodities recycled and amounts are:

Wood	8,125 pounds
Metal	21,495 pounds
Cardboard	1,285 pounds
Sheetrock	2,380 pounds
Concrete/Bricks	12,000 pounds
Office Paper	150 pounds

The project is not yet fully completed. However all of the concrete/brick work is done and the framing is 75% complete. We expect that the bulk of the recyclable items have been recycled. Cardboard will continue to be generated. Recycling containers will remain on site. The volume of cardboard will increase due to doors and finish material being shipped in. The site supervisor estimated that around 40% of the waste stream was recycled. He arranged for his crew to do “clean up” to help control contamination. His designated crew would collect the items and place them in the recycling bins. This reduced the need to constantly be training the new sub contractors. The remaining 60% that was landfilled was too time consuming to separate. We collected 6 yards of drywall to test possible recycling alternatives. Our research for markets for this product found distant places to take it but the transportation cost and the \$55 per ton tipping fee was unrealistic for our area. Based upon average trash hauling services the costs to landfill the materials recycled through this program would have been \$1,920.

### **City of Ft. Collins Wood Waste Debris Recycling Pilot Project**

A total of eight individual construction companies participated in the wood recycling pilot project at a total of 13 project sites. Waste-Not Recycling partnered with Pederson’s Recycling and Disposal to provide the collection services for the wood waste. Waste-Not Recycling provided roll-off containers for the larger sites while Pederson’s provided the collection for the smaller home sites. Wood debris was categorized into three building materials: dimensional lumber, particleboard, and plywood/oriented strand board (OSB). Approximately 75% of the entire wood waste stream consisted on plywood and dimensional lumber. The remaining material consisted of 23% particleboard/OSB and 2% trash. The driver viewing the material when it was being emptied from the collection containers obtained these numbers. The participating contractors saved 336 cubic yards from going to the landfill and saved themselves over \$3,000 in trash removal costs. Through this project we determined that it is both feasible and economical to set up wood waste recycling programs for contractors. Since the program has ended we have continued to provide recycling services to contractors saving them approximately 25% of what they would pay to throw the wood with the trash. Comments from the contractors have been positive and they feel that the extra effort of source separating the wood waste is worth it not only for the savings but also for the environmental benefit.

